

REMARKS

In the Office Action, claims 1-3, 5-23, and 25-71 were rejected. By the present Response, claims 1-3, 21-23, 36, 53, and 56 are amended. No new matter has been added. Upon entry of the amendments, claims 1-3, 5-23, and 25-71 will remain pending in the present patent application. In view of the foregoing amendments and following remarks, Applicants respectfully request allowance of all pending claims.

Rejections Under 35 U.S.C. § 102

Independent Claim 1 is currently amended to include "a dual-conductor linkage" and an independent "safety loopback communications link."

In the Final Office Action dated 6/21/2006, the Examiner did not withdraw the rejection of independent claim 1. The claim was rejected under 35 U.S.C. 102(e) as being anticipated by Heiserholt et al. (U.S. Patent No. 6,198,287, hereafter "Heiserholt"). Specifically, the Examiner stated:

The examiner does **not withdraw** the anticipated rejection to *Heiserholt* and corresponding rejections. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the "distinct" specific physical structure such that the loopback may be separate from the connector assembly and that each master-slave may have an individual loopback communications link as illustrated e.g., in applicant's figure 11 and in view of applicant's arguments in their remarks on page 15) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26USPQ2d 1057 (Fed. Cir. 1993). As such, the examiner notes that at least the central bus 44 which is connected between the master station and slave stations and thus acts as a safety loopback. In particular, since the central bus is used to control the components, the bus acts as a safety loopback. Specifically, the applicant's paragraph 72 teaches that the safety loopback is used for

sending/receiving commands thus meeting the above interpretation of a safety loopback.

Office Action, page 2-3, item 4.

Applicants have amended claim 1 to include both “a dual-conductor linkage”, and an *independent* “safety loopback communications link.” Applicants believe the amendment places the claim in condition for allowance because Heiserholt fails to disclose *both* of the claimed elements.

As previously presented, the safety loopback communications link and dual-conductor linkage are distinct and are particularly of interest as described in paragraph 71 of the application.

The present technique also may provide a hard-wire for one or more of the slave nodes, such as system critical slave nodes. *Fig. 11 is a diagram illustrating an exemplary dual-conductor network 600 having dual-conductor linkages 602 (e.g., high and low CAN linkages) between a master node 604 and a plurality of slave nodes, such as slave nodes 606-614. As illustrated, a hard-wire linkage 616 extends between the master node 604 and the slave node 606 and a hard-wire linkage 618 extends between the master node 604 and the slave node 612. Similar hard-wire linkages, or a single hard wire linkage, may extend between the master node 604 and all of the slave nodes 606-614.* In operation, these hard-wire linkages, or safety loopback wires, may be used for critical messages, commands, or in situations where one or more system component is not operating properly. For example, the network 600 may toggle the signal to one of the hard-wire linkages for immediately notifying the master node 604 of a communications or device error.

Application, paragraph 71. (emphasis added.)

Furthermore, the communications protocol or signal for the safety loopback communications link is not limited to the same communication signal as is used by the

dual-conductor linkage, and thus can perform a variety of different communication functions. As disclosed, the master node and various slave node or nodes may be coupled in a variety of different manners, and may use different communication modules as discussed in paragraphs 58 and 66 of the application.

Fig. 7 is a diagram illustrating exemplary components of the master and slave nodes described above. *As illustrated, the master and slave nodes have a variety of communications, guarding, messaging, and command management modules to increase safety and efficiency of the imaging system 10 disposed on the network 200.* For example, the master node 202 may comprise a uniform communications module 214, a routine operational guarding module 216, a code error guarding module 218, a message integrity guarding module 220, an emergency notification module 222, and a control/command management module 224. Similarly, one or more of the slave nodes 204-212 may comprise a uniform communications module 226, a routine operational guarding module 228, a code error guarding module 230, a message integrity guarding module 232, an emergency notification module 234, a control/command management module 236, an asynchronous process data module 238, and a synchronous process data module 240. The foregoing modules 214-240 may comprise a variety of hardware and software, which may be integral or add-on components of the imaging system 10 and its components (e.g., subsystems and peripherals).

Application, paragraph 58. (emphasis added.)

The techniques described above with reference to Figs. 6 and 7 are applicable to a wide variety of medical diagnostic and imaging systems, including various networks of medical equipment at one or more sites and for one or more medical modalities. Fig. 8 is a diagram illustrating an exemplary medical system network 300 for the imaging system 10 illustrated by Fig. 1. As illustrated, the medical system network 300 communicatively couples various components (e.g., subsystems or peripherals) of the imaging system 10 via a dual-conductor assembly 302, which may comprise a CAN high conductor 304 and a CAN low conductor 306. *Although not illustrated, the various components may be coupled in series, in parallel, or in a combination of series and parallel connections.* In the illustrated embodiment, the medical system network 300 has a master node 308 and a plurality of slave nodes, such as slave nodes 310-326, which are distributed throughout the imaging system 10 at components within subsystems 12, 14, and 16. For example, the data

acquisition system 12 has slave nodes 310, 312, and 314, the control system 14 has slave nodes 316, 318, and 320, and the interface system 16 has slave nodes 322, 324, and 326. These slave nodes 310-326 may represent any desired medical components, peripherals, or subsystems, such as the components illustrated by Figs. 1 and 4.

Application, paragraph 66. (emphasis added.)

Moreover, Figure 11 of the application shows two distinct and dedicated lines 616 and 618, separate from the dual-conductor linkage 602. The figure clearly illustrates the *independent* safety loopback communications link between the master node and slave nodes. Heiserholt makes no mention of this *independent* safety loopback communications link between the master node and any of the slave nodes for the magnetic resonance apparatus disclosed. The description specifically describes a single bus originating from the can master 42. *See* Heiserholt, column 3, lines 52-54. Furthermore, Fig. 2 shows a single bus line in conjunction with the can master 42. Applicants believe that the single bus line is, at best, equivalent to the dual-conductor linkage element of the current application. Heiserholt fails to disclose *both* the dual-conductor linkage element and the *independent* safety loopback communications link element. Thus, Heiserholt does not disclose all of the claimed elements. Therefore, Applicants believe the 35 U.S.C. 102(e) rejection cannot be sustained and respectfully request that the Examiner withdraw the rejection.

Independent claim 21 is currently amended to include “a network master node communicatively coupled to the network slave nodes via a dual-conductor linkage” and an independent “safety loopback communications link.”

For the same reasons as stated for claim 1, the Examiner did not withdraw the rejection for independent claim 21. The claim was rejected under 35 U.S.C. 102(e) as being anticipated by Heiserholt. Similarly to claim 1, Applicants have amended claim 21 to include “a network master node communicatively coupled to the network slave nodes via a dual-conductor linkage” and an independent “safety loopback

communications link.” Applicants believe the amendment places the claim in condition for allowance because Heiserholt fails to disclose *both* the dual-conductor linkage element and the *independent* safety loopback communications link element. Therefore, Applicants believe the 35 U.S.C. 102(e) rejection cannot be sustained and respectfully request that the Examiner withdraw the rejection.

Independent claim 36 is currently amended to include “coupling the master node to each slave node via a dual-conductor linkage” and communicating between the master and slave node via an independent “safety loopback communications link.”

For the same reasons as stated for claim 1, the Examiner did not withdraw the rejection for independent claim 36. The claim was rejected under 35 U.S.C. 102(e) as being anticipated by Heiserholt. Similarly to claim 1, Applicants have amended claim 36 to include “coupling the master node to each slave node via a dual-conductor linkage” and communicating between the master and slave node via an independent “safety loopback communications link.” Applicants believe the amendment places the claim in condition for allowance because Heiserholt fails to disclose *both* the dual-conductor linkage element and the *independent* safety loopback communications link element. Therefore, Applicants believe the 35 U.S.C. 102(e) rejection cannot be sustained and respectfully request that the Examiner withdraw the rejection.

Independent claim 53 is currently amended to include a safety loopback communications means with “the safety loopback communications means communicating signals separately from the uniform communications means.”

For the same reasons as stated for claim 1, the Examiner did not withdraw the rejection for independent claim 53. The claim was rejected under 35 U.S.C. 102(e) as being anticipated by Heiserholt. Similarly to claim 1, Applicants have amended claim 53 to include a safety loopback communications means with “the safety loopback communications means communicating signals separately from the uniform

communications means.” Applicants believe the amendment places the claim in condition for allowance because Heiserholt fails to disclose *both* the dual-conductor linkage element and the *independent* safety loopback communications link element. Therefore, Applicants believe the 35 U.S.C. 102(e) rejection cannot be sustained and respectfully request that the Examiner withdraw the rejection.

Applicants request the withdrawal of the 35 U.S.C. 102(e) rejection of all the dependent claims.

As discussed above, Applicants believe that Heiserholt cannot support a *prima facie* case of anticipation of independent claims 1, 21, 36, and 53. Moreover, Applicants traverse the 35 U.S.C. 102(e) rejections of the dependent claims based on their dependency on an allowable independent claim. For these reasons, Applicants also respectfully request withdrawal of the rejections of all dependent claims under 35 U.S.C. § 102(e).

Rejections Under 35 U.S.C. § 103

Independent claim 1 distinguished from the previously cited 35 U.S.C. 103(a) references.

In the Office Action dated January 24, 2006, the Examiner rejected dependent claim 4 that included the safety loopback communications link element. The claim was rejected under 35 U.S.C. § 103(a) as being anticipated by Heiserholt in view of Dittmar et al. (U.S. Patent No. 5,784,547 A, hereafter “Dittmar”). The claim was also rejected under 35 U.S.C. § 103(a) as being anticipated by Heiserholt in view of Novakovich et al. (U.S. Patent No. 5,404,465, hereafter “Novakovich”). In response to the Office Action, Applicants canceled claim 4 and moved the safety loopback communications link element into independent claim 1. In the Final Office Action dated June 21, 2006, the Examiner did not establish a new rejection to claim 1 based on the amended and canceled claim.

However, in the interest of advancing prosecution, Applicants note that these references do not disclose the subject matter of currently amended claim 1.

Applicants have carefully reviewed Heiserholt, Dittmar, and Novakovich; and believe that none of the references disclose the independent safety loopback communications link element as recited in the amended claim. Dittmar specifically teaches a double-bus architecture or a redundant bus configuration. *See* Dittmar, column 4, line 16-18. Dittmar further shows the purpose of the redundant bus in Fig. 3 by illustrating the failure of the primary bus. Dittmar does not teach a separate and dedicated line to any of the slave nodes. Instead the reference shows two public bus lines between *all* of the slave nodes. The purpose of the redundant bus is to handle process data if a fault occurs in the primary bus. *See id.*, column 7, lines 49-56.

Novakovich teaches the same configuration only more specifically relating to trainline communication. Novakovich teaches a primary train bus and a back up train bus. *See* Novakovich, column 1, 57-60. Figure 3 of Novakovich is a flow chart demonstrating the functionality of the back up train bus to restore communications if the primary bus fails.

As discussed above, the current invention makes use of a safety loopback communications link that is *independent* of the dual-conductor linkages and is dedicated to certain slave nodes. This is structurally and functionally distinguishable from a redundant bus, especially when a different communications protocol or separate signal is used on this communications link. The safety loopback communications link is structurally distinguishable because the dedicated safety loopback is not necessarily physically run to every slave node as is required by a primary and redundant bus configuration. Such safety loopback communications links may only link the master node and certain slave node or nodes thereby reducing exposure to multiple fault points. The safety loopback communications link is also functionally distinguishable because the

link is strictly dedicated to the connected slave node or nodes, and communicates via separate signaling.

Independent claim 21 distinguished from the previously cited 35 U.S.C. 103(a) references.

In the Office Action dated January 24, 2006, the Examiner rejected dependent claim 24 that included the safety loopback communications link element. The claim was rejected under 35 U.S.C. § 103(a) as being anticipated by Heiserholt in view of Dittmar. The claim was also rejected under 35 U.S.C. § 103(a) as being anticipated by Heiserholt in view of Novakovich. In response to the Office Action, Applicants canceled claim 24 and moved the safety loopback communications link element into independent claim 21. In the Final Office Action dated June 21, 2006, the Examiner did not establish a new rejection to claim 21 based on the amended and canceled claim. However, in the interest of advancing prosecution, Applicants note that these references do not disclose the subject matter of currently amended claim 21. In particular, as discussed above, Applicants have carefully reviewed Heiserholt, Dittmar, and Novakovich, and believe that none of the references disclose the safety loopback communications link element as recited in the amended claim. Thus, Applicants believe that the Examiner can not establish a *prima facie* case of obviousness based on any combination of these references.

Independent claim 56 is currently amended to include “coupling the master node to each slave node via a dual-conductor linkage” and communicating between the master and slave node via an independent “safety loopback communications link.”

In the Final Office Action, the Examiner restated the rejection of independent claim 56 under 35 U.S.C. § 103(a) as being anticipated by Heiserholt in view of Funahashi et al. (Patent Application 2002/0081039, hereafter “Funahashi”). However, the Examiner failed to address the Applicants’ argument with regard to independent claim 56 in the Final Office Action. Furthermore, like the other independent claims, Applicants have amended claim 56 to include “coupling the master node to each slave node via a dual-

conductor linkage” and communicating between the master and slave node via an *independent* “safety loopback communications link.” Applicants have carefully reviewed both Heiserholt and Funahashi, and believe the amended claim overcomes the 35 U.S.C. 103(a) rejection.

In the Office Action dated January 24, 2006, the Examiner correctly commented that the only relevant teaching of Funahashi is generating the medical diagnostic image. The reference shows a schematic of a network only to illustrate the relationship among the related hardware and software. *See* Funahashi, figure 1. Only one bus line is shown and Funahashi is silent as to a second communications link between the master and any of the slave nodes.

A *prima facie* case of obviousness under 35 U.S.C. § 103 requires *all* of the claimed elements be found in the references. Heiserholt and Funahashi, even considered together, do not disclose *both* a dual-conductor linkage element and an independent safety loopback communications link element. Therefore, Applicants believe the Examiner has failed to establish a *prima facie* case of obviousness and respectfully request that the Examiner withdraw the rejection.

Applicants request the withdrawal of all 35 U.S.C. 103(a) rejections for the respective dependent claims.

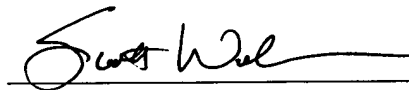
Applicants have carefully reviewed all of the cited references and believe that none of the references disclose the safety loopback communications element as currently claimed in each independent claim. Thus, Applicants believe that the Examiner can not establish a *prima facie* case of obviousness for any of the dependent claims in view of the amendments. For these reasons, Applicants respectfully request withdrawal of the rejections of all dependent claims under 35 U.S.C. § 103(a).

Conclusion

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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